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rôle played by numerous species is distinctly outlined, based on the examination of the contents of their stomachs. The report is made attractive to the general reader not only by the valuable information it contains but by a series of beautiful chromo-lithographic plates, from drawings made by the well-known bird artist Fuertes. The species figured are the Red-headed Woodpecker, adult and young; Northern Hairy Woodpecker, White-backed Three-toed Woodpecker, Flicker, Yellow-bellied Sapsucker, Black-backed Tree-toed Woodpecker, Red-breasted Nuthatch, Blackburnian Warbler, Mourning Warbler, Yellow-billed Cuckoo, Solitary Vireo, Black-capped Chickadee, Brown Creeper, Blue Jay, and American Red Crossbill, all well adapted for striking effects.—J. A. A.

**Beal on California Birds in their Relation to the Fruit Industry.**<sup>1</sup>—This 'Bulletin,' is based on investigations by the writer in California during the fruit seasons of 1901, 1903, and 1906, covering a period of about nineteen months. Dr. C. Hart Merriam, Chief of the Biological Survey, in his 'Letter of Transmittal' to the Secretary of Agriculture, says: "The investigations embodied in this report were undertaken with a view to the accurate determination of the economic status of every species of California bird that inhabits orchards, in order that it may be possible for the fruit raiser to discriminate between friends and foes; and for the added purpose of suggesting remedial measures for the protection of fruit from destructive species." Professor Beal, in summarizing his results, insists "that sound public policy everywhere forbids the destruction of birds on a large scale for the purpose of protecting orchard fruits. Wholesale slaughter of birds in the supposed interest of the orchardist is fortunately rare and often proceeds from a mistaken idea of their economic relations. When it is understood that the damage by certain species is local and exceptional, that the birds in question are on the whole beneficial and that their destruction will be a loss to the State, the farmer and the orchardist are usually willing to adopt less drastic measures in defense of their crops and to spare the birds for the sake of the general weal."

After discussing the causes and general conditions of depredations by birds, the birds that injure fruit in California are passed in review and the evidence bearing on the economic status of each is given in much detail, based on the examination of their stomach contents. The House Finch (*Carpodacus mexicanus frontalis*) is stated to have been the subject of more complaint than all other species of birds together. Yet the examination of over 1200 stomachs shows that fruit is far from being its principal food, which consists mainly of the seeds of weeds, and that a far greater quantity of fruit is eaten by other species, as the Cedar Waxwing and the

<sup>1</sup> Birds of California in Relation to Fruit Industry, Part I. By F. E. L. Beal, Assistant, Biological Survey, U. S. Department of Agriculture. Biological Survey, Bulletin No. 30, 8vo, pp. 100, with a colored frontispiece (California Bush-Tit) and 4 half-tone plates. Issued Nov. 11, 1907.

Robin. The Western Tanager (*Piranga ludoviciana*) becomes occasionally a nuisance in the orchard, but for the most part is a resident of other districts than the fruit growing region. The Swallows, as a group, are exceptionally beneficial birds, subsisting almost wholly, at all times, upon insect food. The Vireos also subsist chiefly upon insects, and are innocent of depredations upon fruit, but they possess a fondness for coccinellid beetles, the enemies of the bark scale and plant lice. The Warblers, as would be expected, come in for unqualified praise as beneficial species, their food being not only almost wholly insectivorous but consisting largely of noxious species. The Wrens, Creepers, Nuthatches and Titmice have also an equally good record; but the Mockingbird and certain of the Thrushes, including the Robin, but not the Bluebirds, partake more or less of fruits; but the verdict, for even the Robin, is that they are far more beneficial than injurious.

This valuable report is illustrated by one colored and three plain plates of as many species of birds, drawn by Fuertes, and one illustrating the seed diet of the House Finch. The evidence here presented should go far to place the smaller birds of California in their true light of benefactors rather than foes of the orchardist and farmer, the debit and credit accounts, presented apparently with great fairness and from positive information, balancing greatly in their favor. — J. A. A.

**Howell on the Relation of Birds to the Cotton Boll Weevil.**<sup>1</sup> — This is the third report of progress on the investigation of birds in their relation to the rapidly spreading cotton boll weevil pest in Texas and Louisiana. "As a result of investigations carried on intermittently during five seasons 43 species of our native birds have been found to feed on the weevil," some of them in summer, others in winter. The results of these thus far rather limited investigations are given in detail for each species. Of the 86 species studied in this connection, just one half are boll-weevil-eating, and one half are not. But birds have been proved to be so important a check upon the spread of this pest that recommendations are presented for the legal protection of certain weevil-eating species now wholly unprotected in Texas, the erection of nesting boxes for Martins, and the dissemination of information regarding the important aid afforded by birds in holding in check this grave pest. Among the most useful species in this respect are the Flycatchers, Orioles, Blackbirds, certain of the Sparrows and Finches, the Swallows, etc. The report is illustrated with designs for Martin houses, text figures of the Barn Swallow, Kingbird and Crow-Blackbird, and a colored plate of the Baltimore and Orchard Orioles. — J. A. A.

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<sup>1</sup> The Relation of Birds to the Cotton Boll Weevil. By Arthur Howell, Assistant Biologist, Biological Survey. U. S. Department of Agriculture, Biological Survey, Bulletin No. 29. Pp. 30, 1 colored plate (frontispiece), and 6 text figures.